

CHAPTER - VII

POLICY RECOMMENDATION FOR THE DEVELOPMENT OF SERICULTURE AND SILK WEAVING INDUSTRY

7.1 GRAINAGE SECTOR

7.1.1 Policy Recommendation for Modernisation of Building and Tools

To increase productivity and efficiency of the production system in grainage sector in Malda district modernisation of grainage building is one of the basic prerequisite. Modern grainage building as proposed by CSRTI is essential for betterment of quality and increase in the quantity of production as these grainage buildings are climatically controlled. The cost of modern grainage building will be nearly Rs. 2.35 Lacs in Malda district. Most of the grainages are producing DFLS in their living rooms. So separate modern grainage building is essential to develop the grainage sector. However this type of building is suitable for the units producing above two lacs of DFLs in a year.

A modern grainage building includes electric fan, heater, air cooler exhaust fan, and refrigerator, a guide book to control the weather or weather chart, net for windows, spray machine to wash the grainage building, different type and size of tray for keeping DFLS.

An alternative to modern grainage building is a building where walls are made of mud, roof made of tali and plinth made of pucca brick having a height of about 12 to 13ft. and room size of 12ft x 20ft., having proper ventilation may be more effective for those producing below 50,000 DFLs in a year. The cost of this type of building will be as low as Rs. 45,000.

Besides raw brick walls are to be preferred than burnt brick wall. The CSRTI, Mysore has recommended a four-inch gap between the outer burnt brick layer and inner raw bricklayer of the wall. This type of building also will be costlier than the above alternative proposed building.

Improved modernised tools should replace the traditional tools. The list is provided in Table 7.1

Table 7.1
Suggested Improved/Modernised Tools and Processes

Traditional tools & processes presently in vogue	Suggested improved/modernised tools & processes
1. Dala size- 4ft-6ft X 5ft-6ft made of bamboos. Capacity of seed cocoon is 6 to 8 kg. Presently gap between two dala is 6inch.to 8inch. Coarsely oven with thick bamboo strips.	1. Dala size should be 3ft-6inch X 4ft, made of bamboo. Capacity of seed cocoon should not exceed more than 4 kg. Gap between two dala should be minimum 10inch to 12inch. Fine oven with thin bamboo strips.
2. Cups are made of mud for keeping chakree. The hole of cup is very small and size of the cup is very small.	2. Cups should be made of mud but the shape should be equal and the required hole should be standard according to the size cup. Cups made of mud should be of the shape of plastic/malamine cup proposed by CSTRl.
3. Ordinary steel /aluminum plate.	3. Tray for keeping DFLs proposed by CSRTI is essential.
4. Ordinary paper for keeping DFLs.	4. Better quality of paper only for DFLs proposed by the CSRTI. Boxes/small packet made only for DFLs.
5. Old processes to warm the room by lighting coal.	5. Electrical room heater either blow type or radiation type (rod heater) serves the purpose. If electricity is not available, smoking glowing charcoal can be used. The charcoal should be used only in the charcoal stores, which have air supply holes from the sides. Glowing charcoal should be kept covered by a layer of ash so that it lasts costs for longer time emitting moderate heat.

Besides the above mentioned improved tools grainage units having production capacity above one lac DFLs in a year can purchase an air cooler, refrigerator, spray machine, incubation container for the production of DFLs. The grainage units having production capacity between 50,000 to 1, 00,000 DFLs per annum can use partly improved tools. The grainage unit having capacity of production below 50,000 DFLs per annum can not afford any investment for improved tools hence subsidy will be necessary for these units.

7.1.2 Policy Recommendation for Distribution of Inputs

To make the production system more efficient and to increase the productivity the raw material requirements should be fulfilled to ensure regular supply of

significant and better quality of raw materials (seed cocoon) following steps are necessary for grainage sector;

- (i) The total requirement of DFLs per year in Malda is approximately 4.5 crore. Thus the annual requirement seed cocoon is 1, 69,811.32 kgs. The average requirement of seed cocoon per season is nearly 42,452.00 kgs. Only 9.47 % of the seed cocoon are produced in Malda district and rest of the requirement of seed cocoon is met from other states or districts. So there is a need for the increase of seed cocoon production. The following steps may be taken up for the purpose;
 - (a) All the seed cocoon producers should get them registered. The registration certificate should be issued only on the fulfillment of following the prescribed criteria, related to experience of the producers, amount of production, quality of production, size of the farmhouse and other miscellaneous norms proposed by CSRTI.
 - (b) All the seed cocoon producers should purchase basic seed cocoon from central or state sericultural board.
 - (c) There should be a price fixation strategy for seed cocoons based on pupation rate/ live pupa percentage.
 - (d) New preservation schedules for cross breed eggs should be adopted. There should be improvement of these schedules so as to tide over the demand and supply programme.
 - (e) New biovoltine seed preservation schedules should be adopted.
 - (f) Popularisation of loose egg production technology should be introduced
 - (g) Strict quality control measures should be adopted.
 - (h) Exclusive package for mulberry and silkworm for seed crop rearing should be adopted.
 - (i) All the seed cocoon producers should be in constant touch with the sericultural office. The sericultural office includes extension officers who will supply better suggestion to the seed cocoon rearers at a proper time.
 - (j) On the basis of surveyed data, the total requirement of seed cocoon for Malda district for 2008 has been projected and the following optimum numbers of seed cocoon produce are to be organized (Table 7.2).

Table 7.2
Optimum Numbers of Seed Cocoon Producers and Produce

Sl. No	Sources District/States	By 2005 option no of seed cocoon producers	Percentage of seed cocoon may be supplied for Malda 2005	2005 Average production of seed cocoon for seasons in kgs.
1.	Murshidabad	125	29.33	1,2,500
2.	Midnapur	075	17.30	7500
3.	Jalpaiguri	042	10.67	4200
4.	Nadia	051	12.08	5100
5.	Malda	042	9.47	4200
6.	Karnataka	050	11.68	5000
7.	Uttar Dinajpur	015	4.47	1500
8.	Darjeeling	021	5.00	2100
	Total	425	100.00	42500

(ii) Sericultural institution should supply pure formalin and bleaching powder and all the required medicine for disinfecting the grainage building to the grainage.

7.1.3 Policy Recommendation for Modernisation of Production Technology

To increase productivity and efficiency of the modernised system in grainage sector, modernisation of technology is one of the basic prerequisites. Most of the grainage in Malda district are associated with Nistari DFLs production. They are not aware of the process of the production of Bivoltine and Multivoltine breeds. Hence bivoltine by hybrid $CSR_2 \times CSR_5$, $CSR_2 \times CSR$ and the cross breed $BL_{24} \times NB_4 D_2$, $KAxNB_{74} \times NB_2 D_2$, $BL_{24} \times NB_4 D_2$ have to be used exclusively. In Malda district only 16.92% of commercial cocoon production results from biovoltine crossbreeds in particularly two seasons i.e. Aghrani; and Chaitra. So the following production mix of DFLs may be suitable for the district of Malda.

Table 7.3
Production Mix of DFLs Suggested for Zone No. I of Malda District

Sl. No	Name of the seasons	Type of DFLs production	Optimum production mix (in percentage)
	Chaitra	Bivoltine/multivoltine (F1)	60 to 80
	Aghrayani	Bivoltine & Multivoltine (F1)	55 to 75
	Baisakhi	Nistari	100
	Vaduria	Nistari	100
	Jasthi	Nistari	100

(Sericultural Zone No.-1 Includes Kaliachak-I, II & English Bazar blocks)

Table 7.4
Mix of DFLs Suggested for Zone No. II of Malda District

Sl. No	Name of the seasons	Type of DFLs production	Optimum production mix (in percentage)
1.	Chaitra	Bivoltine/multivoltine	30 to 50
2.	Aghrayani	Bivoltine & Multivoltine	25-40
3.	Baisakhi	Nistari	100
4.	Vaduria	Nistari	100
5.	Jasthi	Nistari	100

(Sericultural Zone-II includes sericultural area of Manikchak, Ratua I, Harischandrapur, Chanchal, Old Malda, Habibpur and Gazole blocks.)

In order to improve the quality of the production testing of moth may be done strictly by trained government technicians Grainage houses and their surrounding should be disinfected properly by calcium hydrochloric, 5% soap solution should be used for disinfecting grainage houses. Bleaching powder should be used for disinfection of floor and surroundings.

7.1.4 Recommendation for Marketing Process

The production of grainages sector i.e. DFLs are perishable in nature hence needs to be marketed immediately after their production and the presence of regulated market will provide the grainages an opportunity to avail of better price for their produce and so that they could avoid middlemen. The marketing process of DFLs should be done in the following way:

- (i) The number of grainage in Malda district should be 392 having production capacity upto one lacs DFLs per seasons as shown in Table 7.5

Table 7.5
Proposed Number of Grainages for Malda District

Sl. No.	Source of Required DFLs in Malda district	No of grainages in 1998	Percentage of required DFLs supplied in 1998	Proposed No of grainages (2005)	Proposed percentage required DFLs to be supplied 2005
	Central or state government	12	10.00	12	10.00
	Registered grainages	114	28.20	392	90.00
	Non registered grainages	268	61.80	NIL	NIL

- (ii) Government should establish DFLs collection centre in Malda district. The number of DFLs collection centre will be 20. Modern cold storage for preservation of DFLs is essential for the proposed DFLs collection centres. The entire DFLs collection centre will collect DFLs from the registered grainages and after fixing the price all the DFLs will be supplied to the silkworm rearers. DFLs collection centre should have an extension officer who will certify the DFLs through a proper test.
- (iii) One of the functions of the distribution cum collection centre could be to mark the produce with different grades while the production process of DFLs is in progress through visit to the registered unit with the extension staff after examining the produce. Rearers should be made aware of the meaning the grades through awareness programmes so that they can take appropriate steps.

7.1.5 Policy Recommendation for Skill Formation and Training

In order to meet the demand for enhanced skill, which will be essential for modernisation of production technology, the basic recommendation is the improvement of skill through training and education of grainures.

- (i) 'Meet together' programme should be arranged at the beginning and at the end of the season. All the owners of the grainages will discuss different type of problems faced by them and try to find out the solutions.
- (ii) Moth testing should be established in every sericultural pocket in Malda district.
- (iii) Government should organise a training programme for the labourers quarterly for three to four days before the commencement the SWR season. They should be paid daily during the training period and only trained labourers should be allowed to work in the grainage sector.
- (iv) Experts organised by CSRTI may visit grainages and offer on the spot advice to the grainure free of cost during every season.

7.1.6. Policy Recommendation for Finance Mobilisation

- (ii) Along with State Government, Nationalised Commercial Banks, Central Co-operative Banks and other financial organizations should come forward to finance grainage co-operative society and grainages with short, medium and long term loans.
- (ii) The short term working capital loan per season per unit to the grainages should be as follows:

Table 7.6
Suggested Short Term Working Capital Loan per Season per Unit

Size of the units production of DFLs per seasons (No's)	Total amount working capital (Rs.)	Amount of loan should (Rs.)
Upto 50,000.	20,000.00	10,000.00
50,000-1,00,000	40,000.00	20,000.00
100,000-150,000	60,000.00	30,000.00
Above 150,000,00	100,000.00	50,000.00

- (iii) Facilities for medium and long term financing to the grainages should be provided from Nationalised Banks in order to enable them to contribute the share capital of the co-operative or to venture for fixed capital investment in the grainages activity. The amount of long-term loan for modern grainage building and equipments should be as follows: Loan should be paid as a centrally sponsored scheme on 50:50 bases.

Table 7.7
Amount of Long Term Loan

Size of the grainage production of DFLs in (Nos) per season	Type of building	Amount of Expenditure (Rs.)	Amount of Long-Term Loan (Rs.)
1. Bellow 1 Lac	Wall made of mud, plinth should made of pucca brick and roof made of Tali	30,000.00 to 50,000.00	25,000 to 30,000
2. Above 1 Lac season	Pucca bulding proposed by CSRTI	1.5 Lac to 2.3 Lac	75,000 to 1 Lac

7.1.7 Policy Recommendation for Co-operative

Co-operative movement has made a significant breakthrough in the various agro-based industries in India. The white revolution in India is mainly characterised by the co-operative movement in dairy farming under a well-known programme Operation Flood. The Anand type of dairy co-operatives being the integral part of the programme, have gained worldwide importance and played a major role in production and marketing of milk. As in the case of Anand Type co-operatives all the problems related to sericulture and silk industry may be solved through the establishment of different co-operative societies under different sectors of sericulture and silk weaving industry. So grainage co-operative societies should be formed with optimum number of grainages. The structure and function of the grainage co-operative society should be as follows;

- (i) Primary grainage Co-operative Society at block level consists of members within the village, of the block jurisdiction. The primary grainage co-operative society should have management committee of nine representatives elected by the members for a term of three years of which one will be the chairman.
- (ii) The District grainage Co-operative union represents all the primary co-operative societies, the chairman of which will be the member of the union. The union will be managed by a management committee consisting of 19 directors elected by the members of the union, which in turn elects its own president. This union will have large professional staff managed by the managing director.

- (iii) The District grainage co-operative union should be responsible for the distribution of seed cocoon and other inputs i.e. formalin, bleaching powder and paper for keeping DFLs, to the primary grainage co-operative society. The primary grainage society may supply seed cocoon to the grainages according to their capacity.
- (iv) The technical staff will visit these societies regularly say, once a week and solve the problems of the grainages.

7.1.8 Policy Recommendation for Extension and Innovation

The need for research in grainage sectors varies depending upon local climatic conditions, specific requirements and available resources. Keeping these facts in view the Central/State Government encourages research institutes and junior college/university teachers to pay attention to extension system. The important task of the extension system should be;

- (i) Rely on scientific and technical education for high productivity and high quality.
- (ii) Demonstrate both traditional and modern methods for easy adoption of modern methods by grainages.
- (iii) Organise Entrepreneur Development Programme.
- (iv) Import high yielding Bivoltine hybrid layings.
- (v) Implementation of project package schemes in grainage unit.
- (vi) To adopt the low cost technologies suitable for grainage sector.
- (vii) Create quality awareness among the grainure.
- (viii) Encourage proper utilisation of by products to bring down the cost of production.
- (ix) To identify technologies based on research findings in last two to three years for field demonstration.
- (x) To organise more first line and front line demonstration and collection of data for fine tuning the technology to suit the local needs.

7.2 Silkworm Rearing (SWR) Sector

Sericulture technology should be aimed at reasonable profitability for farmers. Since, cocoon forms the raw material for raw silk and silk industry, and contributes

nearly 80% of the cost of raw silk production, it is necessary to produce the same at minimum cost. But, while attending to all suggested techniques, we have to work for different scales of input and management. The implements, which are definitely cost-effective for small and marginal farmer, cannot be so for big farmers or small industrial set-up. In Malda, silkworm rearing is gaining attention of rich farm owners as also certain sectors of textile industry. This further strengthens the need for assessing technological aspect against input output ratio.

7.2.1 Policy Recommendation for the Development of Mulberry Cultivation

- i) Govt. should supply improved mulberry cuttings like S-1, S-13, S-34, S-799, S-1635 and K-2. The present supply of improved mulberry cuttings is very low. This is nearly 7000 to 8000 in a year, which satisfies only about 1.00 % of the requirement. So there should be provision of the 100 % supply of the improved mulberry cuttings to replace all the local varieties. If Govt. increases the supply of mulberry cuttings from one percent to 20 percent then all the mulberry cultivated area under local variety will be transferred into improved mulberry garden with in 5 years (Table 7.8)

Table 7.8
Suggested Transfer of Local Mulberry Land into Improved Variety

Sericultural Zone	Area under Local mulberry variety (Acres)	Percentage of land under local variety	Local mulberry variety should transferred into improved variety per year (in acres)
1. Kaliachak-I	5704.72	56.27	1140.80
2. Kaliachak-II	3606.62	35.58	721.20
3. Other blocks	826.23	08.15	165.20
Total	10137.57	100.00	2027.32

Besides, for widespread propagation of sericulture, the farmers should be trained in preparation of mulberry saplings. State Sericulture Department at reasonable rates should purchase these saplings. This would ensure additional income for the sericulturists on one hand and immediate supply of the saplings to the farmers and the entrepreneurs on the other.

ii) Nearly 61.67 % of the mulberry cultivated lands have no irrigation facilities in this district. So proper water supply facility should be provided to cover 13600 acres of mulberry cultivated land 75.83 percent of the rearers in the district have below 1.00 acre of land under mulberry cultivated land. Hence for this small and very scattered cultivated land, tube wells and pump sets are more effective than other type of irrigation. Tube wells and pump sets could provide water through out the year. No of Proposed Tube well/ Pump set are shown in Table 7.9.

Table 7.9
Planned Irrigation System

Name of the Sericultural Zone	Area under Mulberry cultivation without irrigational facilities in acres	Not of Tube well/ Pumpset per 5 acres
1. Kaliachak-I	6676.57	1335.06
2. Kaliachak-II	2691.27	538.00
3. English Bazar	0664.33	132.00
4. Other Blocks	825.43	165.00
Total-	10857.62	970.00

- iii) Mulberry sapling nurseries should be established in order to supply the required no to the homestead for plantation. Government should take initiative to plant mulberry trees (S-34 and S-1635) along roads/rivers banks/govt. fallow land so that this marginal land is being used and made productive.
- iv) In order to meet the high demand of mulberry cuttings Government may take a policy. The sapling will be provided to a rearer by the organisation free of cost, but on condition, that after maturity the rearer is to return the double amount of mulberry sapling to the sources or organisation.
- v) Though many pests both insect and non-insects have been reported to cause damage to mulberry, not much information is available about the majority of pests. There is need to generate information on the seasonal incidence of variety of pests indifferent agro-climatic conditions. Sericulture is practiced in non-traditional areas where the type of pest problems needs to be evaluated. There is need to work the pest status,

economic injury level, period of occurrence and extent of loss. In view of developing many highly productive mulberry varieties, there is a necessity to screen the varieties for their susceptibility, tolerance or resistant parameters/ characters; there is an urgent need to develop an IPM package in order to manage, particularly for serious pests with eco-friendly practices.

vi) The nematode population is high in sick soil where the fertility of the soil has reached the lowest ebb. So it cannot support the growth of plant any more. To prevent the nematode attack the following methods may be adopted for proper growth of the mulberry plants.

(a) By physical control.

(i) The topsoil may be burnt down before taking up new plantation.

(ii) Adoption of heat sterilization technique i.e., deep ploughing of the soil and sterilisation by solar heat.

(b) Using crop residues or waste products.

(i) Dry grass, paddy straw, avena or wheat straw is found to improve the fertility level of soil as well as suppress the nematode population in the field.

(ii) Green manures e.g. sesbania, sun hemp or utilized cabbage or cauliflower leaves, pineapple or eichornia leaves reduce the root knot disease effecting by incorporating the green plant material in the soil.

(c) Enrichment of soil by oil cakes: The oil cakes like neem oil, machu oil, this, castor, soyabean or cotton seed have been found to improve the fertility status of sick soil and simultaneously reduces the nematode population in the affected fields.

(d) Biological control of nematode in the tired soils. Control of root knot nematodes through biological agents is the environment with increasing population of parasites and predators of nematodes in the soils, may be adopted.

(i) By the use of trap crop. Oostenbrink and his colleagues (1957) introduced *Targets* spp. this can effectively suppress the population of some plant parasitic nematodes. They found that *T. patuala* and *T. erecta* planted between the rows suppressed the population of *praty lenchus* in the

roots of the other perennial plants and soil, resulting in sector growth of the host plant. Asparagus exudes a nematicidal chemical from crops. Thus, the use of trap crops provides potential control measures in perennial crops. (Das, B.K., Ghosh, P.K., and Sarkar J.1994).

(ii) Control through biological agents: changing the natural may do Biological control balance of environment through increasing population of parasites or predators of nematodes in the soil. More than 100 fungi have been found to be nematophagous that feed on nematodes either as predators or as parasites. These fungi are abundant in soil and can be successfully used to encounter nematodes. Nematode trapping fungi is also used to control the spread of nematode.

(iii) Introduction of resistant varieties is perhaps the best measures against nematodes. A line of tomato HES4875 from a cross of *L. esculentum* and *L. Peruvianum* was raised (Thompson and Smith, 1957) which is highly resistant to *M. incognata acrita* and the resistance is governed by a single dominant gene. Ellenby (1945) also screened some *solanum* spp. and obtained resistant lines against *heterodera rostochiensis*. The development of resistant character in the mulberry through breeding is still in its infant stages. Efforts are being made to locate the source of resistance in mulberry, which is still under investigation.

vii) Co-operative movement in mulberry cultivation can play a vital role in the development of silk industry. Due to the division of family cultivated land is becoming very small. So if they cultivate jointly then production will be high and the cost of production will be minimized. Below half acres fragmentation of mulberry cultivated land should not be allowed since the land size will not be cost effective. So mulberry cultivation through cooperative system is essential.

viii) The farmers may approach the forest department to include mulberry varieties for plantation in vacant, waste land/road side under social forestry programme for use.

ix) Government should encourage landless silkworm rearer to plant mulberry trees along roads, riverbanks, and other fallow land under PWD and Central Government in Malda under community basis.

x) Government should encourage regeneration of old mulberry plantations remaining unutilized.

xi) The plantation of mulberry, which is a perennial foliage crop, provides an ideal condition for intercropping. The intercropping of mulberry with seasonal vegetables (preferably leguminous such as Lentil and Moong) that fetch good price or additional income should be stressed upon to generate additional income from the land as well as keeping a balance in nutrient content of the soil. The leguminous crops like Masur and Moong have rhizobium bacteria, which are wholly or largely capable of bringing about appreciable nitrogen fixation on roots. Thus, utilizing the aforesaid microorganisms can cover the short supply of nitrogen. Moong improves the soil status, if mulched. So it is advisable to mulch the crop after harvest.

xii) A major project is needed in established sericulture zones to ensure requisite infrastructure facilities and impart technical knowledge to the farmers either free of cost or at subsidized rates. Arrangements should be made with the Banks for long-term soft loans. This would enthuse the farmers to take up sericulture.

xiii) Pruning schedule should be modified replacing traditional bottom pruning in November by top clipping in high altitudes or bottom pruning in low altitude in June and middle pruning in December, since the period of natural precipitation is longer (May to September). The mass pruning programme at farmer's level as per pruning schedule should be carried out to obtain quality foliage for silkworm rearing as it has its impact on quality and quantity of cocoon.

xiv) Organization of more awareness programmes with the assistance of NGO's. Intensive farmer's training, utilizing modern technologies and provision of more government support to NGO's.

xv) Vermitech, an eco friendly concept introducing earthworms into soil to make vermin-compost, is an ancient method and perhaps the best among all sustainable practices. It is used to counter the environmental hazards caused by chemical fertilizers. Vermi composting can reduce the expenditure on chemical fertilizers. This is an eco friendly technology in which seri-agro organic waste can be recycled to value added vermin-

compost. In mulberry bush cultivation, the quantity of vermin compost required is 5 and 10MT/hectare in rain fed and irrigated conditions respectively while 3-8kg is required for free type cultivation according to age and girth of tree

xvi) Disease as one of the major constraints in mulberry leaf production was recognized quite late and much of the investigations are concentrated only on a very few diseases. Even though a number of diseases have been reported on mulberry, detailed studies on their distribution, loss caused and control measures are lacking. In this context research areas need to be identified keeping in view the immediate requirement of the sericulturists. The following areas have been suggested for future research.

- a) Disease forecasting and forewarning systems has to be evolved for major mulberry diseases of field importance.
- b) Disease maps depicting the seasonal occurrence, pathogen, symptoms and their control measures have to be prepared for each region. Preference should be given for pictorial representation so as to aid even the illiterate sericulturists.
- c) A detailed survey on the occurrence of different types of diseases should be conducted on top priority and the actual loss in yield as result of disease should be estimated in each agro-climatic region.
- d) Several cultural practices such as spacing height of pruning, date of pruning, and selection of varieties have a significant influence in minimizing the diseases. Such practices should be identified as and important means for non chemical methods of disease control.
- e) Integrated approach for disease management has to be evolved and popularized with major emphasis on biological and cultural methods.
- f) Mulberry diseases whether minor or major in nature are to be studies in detail and strategies for their control should be kept ready in case of sudden outbreak or the disease.
- g) Economic threshold levels for each disease have to be worked out in order to initiate control measures at appropriate time.

7.2.2 Policy Recommendation for Modernisation of Building

The model rearing houses and sufficient rearing equipments should be provided to all farmers through development schemes in a phased manner

Most of the rearers of Malda district have no separate SWR building. So rearers of this district need modern SWR building. The CSRTI Mysore has recommended a four-inch gap between the outer burnt brick layer and inner raw bricklayer of the wall. The simplest method of preventing the walls from getting heated up is to keep at least six feet wide verandah all around the rearing room. If no Verandah is provided a pandal of thatched materials should be constructed on all four side so that direct sunrays could be avoided. Planting trees all around the rearing room is a long-range remedy against the search. The arrangements should be made to cool the air inside the rearing rooms to bring down the excess temperature. The simplest way is to hang wet curtains of either gunny cloth or any other course cloth so that moist and cool air enters the SWR room. The curtain should always be kept wet. Depending on the size and the location of the SWR room one or more exhaust fans are required.

Another traditional SWR building made of mud wall and tali roof is also more effective than pucca building in the district. So rearers of Malda should construct separate SWR building with low cost. The plinth should be made with pucca brick and the wall should be made of mud or Kuchha brick. The roof should be made of tali and ceiling must be made of bamboo with mud layer.

7.2.3 Policy Recommendation for the Improvement of Tools and Technique

The SWR technology practised by the rearers has to be modernised along with time. The goal of the SWR technology should be to innovate the techniques by which the cost of rearing could be reduced but at the same time cocoon crop yield is enhanced keeping in mind the implication of the process. The SWR of Malda district have no modern tools like air cooler, room heater, net for window, thermometer, exhaust fans.

The common mountages used at present in Malda are of bamboo, wood, plastic material etc. These have common spinning spaces, which gives room for the formation of double cocoons as well as more deformed cocoons. The rotary cardboard mountages are found suitable for high quality cocoons and is mostly used in countries where good quality bivoltine silk is produced. A rotary cocooning frame is a type of

partitioned frame made out of cardboard paper so that one cocoon will be formed in one section. The frame rotates by the movement of the spinning worms, hence, the name 'rotary mountage'. These mountages are efficient, eliminate double cocoons, produce uniform cocoons, prevent soiling of cocoons by dead larvae, and are easy to harvest.

In Malda, the rearers cannot afford to buy good mountages. They, therefore, borrow during the season but are compelled to harvest early, as somebody else needs the chandrika. Therefore the cocoons do not get the required time to spin resulting in immature spinning. The actual time required is 20 days for complete spinning. Therefore the rearers should be supplied with an ample number of good quality chandrika and on the whole the farmers should maintain the rearing equipments in good condition.

All the equipments used in SWR in Malda should be same but their proper utilisation is necessary. The gap between two dalas should be 10"-12". The gap between dala and wall room should be minimum i.e. of about two feet six inches to three feet. The washing of dala with soil & cow dung is not effective. The use phenyl and 5% to 7% of bleaching powder to wash soil is very effective for the dala. All the tools may be disinfected by solar heat for three to four days.

Disease tolerant races of silk worm like KAXNAB₄D₂, NB₇xNB₄D₂ and mulberry varieties such as S₁, S₁₃, S₁₄, S-799 & K₂ specifically introduced to the sericultural pockets of Mahabbatpur, Mothabari, Panchanandapur, Pataldanga, Michutola, Bahadurpur, Chotomohidipur, Silampur, Sripur, Khanpara and Alinagar as the areas are seriously affected by the disease (Fungi bacteria or nematode). Cross contamination within a rearing batch should be, as all the farmers of the province should brush the layings at a time. The over lapping of rearing in a village or within a rearing house should not be allowed & it should be controlled by government rules.

7.2.3 Policy Recommendation for Skill Formation and Training and Labour

Management:

Sericulture is an agro-based labour intensive industry where mulberry cultivation to cocoon production is defined as agriculture activity and processing of cocoon to silk production and weaving falls under industrial operation. However all the process is handled by manual labour force. Thus systematic and effective labour

management is essential not only to ensure optimum utilisation of man power but also for timely execution of various activities for successful cocoon crops. The following important tasks are essential for systematic & effective labour management to ensure optimum utilisation of manpower for a successful cocoon production (Verma R.S., Rao, D.S.M.R, and Suryanarayana, 1999).

- (a) Prepare a labour calendar to know approximately the total labour requirement of particular crop during various seasons is the respective farm units.
- (b) Make suitable arrangement for the employment of hired and family labour during the slack seasons.
- (c) Plan works for rainy days to employ the hired labour on indoor jobs like oil cake crushing, fertiliser mixing, trays and chandrika repairing, cleaning, preparation of straw mountages etc.
- (d) Each day work should be checked out one day before.
- (e) When the work is distributed, the manager/owner should examine twice/thrice a day so that the work may be satisfactory.
- (f) Higher traditional skill requirement is necessary. Thus training programme is essential for labourers engaged in silkworm rearing activities.
- (g) Training centres should be well distributed over Space/Anchalwise and should impart both basic and advanced courses. The stipends paid to the trainees should be suitably enhanced since the rate of stipends paid at present is low and not attractive.

7.2.5 Policy Recommendation for Appropriate Marketing of Cocoon

Marketing channels are the routes through which agricultural products move from producers to consumers. The length of route varies from commodity to commodity, depending on the quantity to be moved, the form of consumers demand and degree of regional specialization of production. Generally, the products sold immediately after the harvest, follows a longer channel. Cocoons are sold within 5-6 days of harvest and reach the consumer through various intermediary process and services. The marketing of mulberry silk cocoons is officially regulated in all major silk producing states of the country except West Bengal. The sericulturists produce

four to five commercial crops in a year and sell them locally mainly to private agencies, sectors or middleman and mahajans. It is observed from the field survey that a negligible amount of cocoon is sold through Govt. and institutional agencies. It is also discovered that a considerable amount of cocoons from outside the state and abroad through the middleman is added to the total production. The marketing channels of cocoon, which are identified during the courses of survey in the district, are cited below.

Table 7.10
Proposed Marketing Channels of Cocoon

Sl. No.	Channel	Percentage of cocoon sold in 2002	Proposed percentage sale of cocoon from 2007 onwards
1.	Farmer –Govt. Raw Material Bank, state filature	7.00	70.00
2.	Farmers- Co-operative cum Reeler	9.13	10.00
3.	Farmers- Khadi institution	28.71	10.00
4.	Farmers – Private Reeler	26.10	3.00
5.	Farmers - Middleman cum Reeler	28.52	2.5
6.	Farmers - Gandhi Ashram cum Reeler	0.54	4.5

Establishment of viable regulated market is of prime importance. Besides Govt. agencies also could come forward with better scope, facilities and services like transportation, grading, storing, weighting etc for transaction of cocoons by the primary growers to keep sericulture as a sustainable remunerative cash crop for small and marginal farmers of this area.

Raw Material Bank or cocoon Bank and Co-operatives should be established at block level particular for Kaliachak I, Kaliachak II Blocks and English Bazar. Each Raw material bank may include following functions:

- (a) Stifling centre or modern drying chamber is necessary for drying the cocoon.
- (b) Raw silk testing unit is essential for testing the amount of raw silk from cocoon and price of cocoon should be fixed through a proper test.

- (c) Sufficient reeling units with modern equipments is essential for each Raw material bank, cocoon bank.

Establishment of cocoon markets by notification under an Act of legislation will help both rearers and reelers, as follows:

- (a) Rearer will get competitive price to his cocoons and correct weight.
- (b) Rearer invariably will receive the payment on the same day of transaction of cocoons.
- (c) Reeler will have the choice to select cocoons required by him by examining visually and by tactile method the lots of cocoons displayed side by side.
- (d) Exploitation by middlemen and private markets will be prevented.
- (e) The rearers who will visit the market will have the benefit of seeing the good quality cocoons with better price. Also, have discussions with such rearers so that he could adopt better practices in mulberry garden and rearing management.

7.2.6 Policy Recommendation for Availability of Good Quality DFLs

To make the production system more effective and to increase the productivity of good quality of silk, DFLs should be fulfilled. To ensure regular supply of sufficient and better quality of DFLs following steps are necessary for SWR sectors:

- (a) The supply of DFLs should be done through seed organisations, which should be under the strict control of government. In Malda 400 grainages having capacity upto one lac in a year should be organised to make an available of required DFLs. All the above said organised grainage should have the following characteristics:
 - (i) All the grainages will purchase their required basic seed from state or central basic seed producers or Research institute.
 - (ii) All the grainages will sell their produces after checking by the governmental agencies or experts.
 - (iii) Rearer of Malda will purchase their required DFLs on the basis of checking report by the governmental research institute/Agency.

7.2.7 Policy Recommendation for Eradication of Silkworm Diseases

Silkworms are affected by a number of diseases due to various biological, chemical, Physical, nutritional and environmental causes. Being poikilotherms, silkworms respond very quickly to the environmental changes, particularly temperature and relative humidity. Higher or lower temperature, humidity, ventilation and feed adversely affect the physiological function of the silkworms. Under these conditions, the disease such as pebrine, flacherie, muscardine and nuclear polyhedrosis/grassere are most prominent. The following methods are more effective to minimize the post copulation in sericulture:

- a) Disease tolerant silkworm races and mulberry varieties specific to region an season are to be developed. The better races of silkworm for different seasons in Malda are more effective.

Table 7.11
Proposed Season wise Use of Silkworm Races

Sl. No.	Name of seasons/Joar/Bunds	Name of the races of silkworm
1.	Chaitra and Aghrani	Multivoltine races like pure Mysore or nistari with different bivoltine races a good number of hybrid lines like MBD4, O(y), D146.
2.	Bhaduri Jasthi and other bund	Pure Nistari

- b) After each cocoon harvest the rearing houses and their surroundings should be disinfected. Calcium hypochlorite (Xiatolin) with soap solution is suitable for disinfecting of rearing houses and bleaching powder for disinfection of floor, surroundings and appliances. Calhydrochlorite does not require any airtight condition to kill the germs. So use of calhypo chlorite should be popular in this district. Besides, the rearing appliances are to be exposed to sunlight for 2 to 3 days. It will help in killing the germs, which are sensitive to sunlight and high temperature and ensure and cent percent disinfection of rearing houses, appliances and surroundings. This method should also be popularised in Malda.

- c) Mass disinfection after completion of each rearing season in a village is a must as all the farmers take up the rearing at a time.
- (d) The overlapping of rearing in a village or within the rearing house is very common, leading to crop contamination within a rearing batch should be limited as all the farmers of any village, should brush the layings at a time.
- (e) Integrated Pest Management (IPM) involves the harmonious use of available methods of pest control in compatible manners. (Samson, M.V., 2000). The use of natural enemies like parasitoids and predators, insect resistant crop varieties, manipulation of cultural practices like crop and inter cropping etc, and mechanical control forms and is the major component of IPM technology. Therefore, IPM approach for all the major and minor pests in sericulture has to be looked into by initiating research projects as per the requirement of farmers.
- (f) The successful manipulation of parasitoids is an important tool under IPM programme and in sericulture. It is widely used against Uzi fly. This technology should be developed and extensively used for other pest population also. Various disinfectants like formalin, bleaching powder, labex, vijefa, RKO etc. play a significant role in making a crop successful. Self-awareness of the farmers is required for the efficacy of these disinfectants and silkworm rearing which is being done (Sen, S.K Feb 2000).

7.2.7 Policy Recommendation for Extension and Innovation

Sericulture is not a routine type of activity. It requires constant improvement based on research results conducted by the CSRTI. For the growth of sericulture most of the sericulturists need a lot of scientific information, skill and knowledge during the period of raising the mulberry garden and also during the period of rearing silkworms, as the activity demands a higher degree of skill and attention.

The sericulture department's Range Officers are required to pay frequent visits to the sericulturists to guide them in work, to check the disease as and when they are detected and to persuade them to cultivate better variety of mulberry with proper manure, fertilizers and watering and to adopt cross-breed races of silkworm and better methods of rearing (Ramana, D.V, 1987)

It is estimated that the optimum area for an Assistant Inspector to provide extension service is 300 bigha. The survey conducted revealed that about 95 percent

of sericulturists could not get any access to the departmental extension service. Availability of adequate extension staff is one requirement, and their dedicated service is another requisite.

The CSRTI should mainly concentrate on the introduction of the new races, both multivoltine and biovoltine, which are moderately disease tolerant. The technologies developed by the institute are field evaluation through its units and later released for popularization. However the, spread of the technologies has been noticed in a limited scale and much needs to be done in this direction for mass polarisations.

Many technologies have been evolved by the Research institute under CSB, which are required to be transferred to field improve the productivity and product quality first of all, the cost technologies suitable for the Malda district are being identified.

7.2.9 Policy Recommendation for Finance Mobilisation

(i) Along with state Government, nationalised commercial central co-operative bank and other financial organisation should come forward to finance the silkworm rearers and silkworm rearer Co-operative society with short, medium and long-term loans.

(ii) The short-term working capital per annum per unit to the silkworm rearers should be as follows the different co-operative societies:

i. A. Short term loan to purchase DFLs. Per annum per unit should as follows.

Amount of Loan (Rs)	Units having rearing capacity of Nos DFLs per season	(Interest 12 %)	(Interest 8 %)
		Amount of installment. (Rs) Total paid by 4 installment	co-operative paid to the any National bank with installme nt Rs.
750.00	300	210.00	202.50
2000.00	600	560.00	540.00
3000.00	800	840.00	810.00

i. B. Short term loan to purchase mulberry leaves per unit per annum should be as follows:

Amount of Loan (Rs.)	Units having mulberry cultivated land (in Bigha)	Amount of installment (Rs.) & Loan paid should be with 4 installment at a interest of 12 %	Amount of installment of co-operatives to the bank at a interest of 8 %
5000.00	bellow 0.5 Bigha of land having capacity of 200 DFLs for rearing	1400.00	1350.00
7500.00	0.5-1.50 Bigha of Land having capacity of 200 to 500 DFLs for rearing	2100.00	2025.00
10000.00	1.50-3.00 Bigha of Land having capacity of 500 to 750 DFLs for rearing	2800.00	2700.00

i. C. Short term loan for purchasing improved traditional tools: Cooperative society at village level may supply new traditional tools to the rearers as a centrally sponsored scheme on 50:50 basis:

Sl. No.	Name of the tools	Current Market Price (Rs./ For one piece)	Should be price At co operatives
1.	Dala (Bamboo Tray) (One)	90.00-110.00	55.00
2.	Chandrika (One)	120.00 - 130.00	70.00
3.	Gharakati	4.00 - 6.00	3.00
4.	Solathani	25.00-30.00	20.00
5.	Thekua	2.00-3.00	1.50
6.	Bothi	100.00-120.00	50.00
7.	Net for wind	20.00-50.00 per mitre	30.00
8.	Rope	20.00-30.00 per 100 ft (Jute)	30.00 (better quality)
9.	Bench	600.00-800.00	500.00
10.	Exhaust Fan	600-1300.00	500.00

i. D. Long term loan to replace the old traditional variety of Mulberry sapling into new improved mulberry sapling per unit per Five years.

Silk worm Rearer having Mulberry cultivated Land (Bigha)	Amount of Loan should be	Loan should be paid by 20 installment for 5 years (Rs.)
bellow 1	4000.00	250.00 per installment
1-3	10,000.00	900.00
3-5	15,000	600.00
5-10	20.000	1200.00

The rearing unit should pay 4 installments in a year. The installment should be collected just after the harvesting of their crops. The co-operative society at village level should purchase their products and will be collected their installment.

i. E. Long term bank loan on subsidy basis for construction of separate rearing building should be as follows:

Type of building	Having cultivated Land (Bigha)	Amount of Loan	Subsidy should be as
a. Mud wall with tali roof (120 sqft with 4/ varanda)	upto 1.00	30,000.00-40,000.00	33%
b. Brick wall with tali roof (160 sqft with 6 ft veranda)	1.00-3.00	75,000.00-1,00,000.00	30%
c. By pucca building propo sed By CSRTI	above 3.00	1.6 Lakhs-2 Lacs	25%

- (ii) Supervision of credit distribution and realization by extension staff is sincerely needed to maintain a financial discipline.
- (iii) State and central government should pay more attention in the financing of research development as well as training schemes taken up for improving silk worm rearing sector and generation of better skills.
- (iv) With the view to expand the market of the product incentives in the form of subsidy should be given to co-operative to organise annual exhibition of

different type of cocoon in different blocks and in different towns. Exhibition cum general meeting also helps the rearer to understand their problems.

7.2.10 Other General Recommendation for Development of Silk Worm Rearing Sector

Generally mulberry tree/leaves cocoon waste and pupae are not effectively utilized hence return, from by products is negligible. So proper utilization of waste of mulberry plant/pupae is essential. The use of following by products is very effective for the development SWR units.

- (a) Mulberry sap wood is yellowish white and the heart wood yellowish brown. The sapwood is nearly as hard as the teak. Being highly shock resistant and not liable to split, it is preferred in the manufacture of sports articles like hockey sticks, cricket bat, and stumps. (Dandin, S.B & Ramesh, S.R, 1987) govt should encourage the industrialists with different facilities to establish manufacturing industry on sports articles in this district.
- (b) The bark of mulberry branches on retting yields white fibre of quality required in textile industry. So the establishment papers industry under Central or State Govt. may go a long way in enhancing the income of the rearers.
- (c) There are many varieties with ornamental values in Russia but mulberry has not gained popularity in India as ornamental plants. So, there is a lot of scope to screen and evolve mulberry variants for ornamental use (Dandin, S.B & Ramesh S.R, 1987).
- (d) To make the production system more effective and efficient the structural needs of the sericultural units should be fulfilled, power supply, water supply, transport and communication etc should be handled by the right authority.
- (e) Movement of rearing appliances from place to place or farmer to farmer should be permitted to control the spread of diseases causing pathogens from one to another. All the farmers should have sufficient appliances for conducting the rearing.

- (f) Considering the risk involved in silkworm rearing there should be a continued effort on cocoon crop protection through an integrated approach of control measures.
- (g) As a precautionary measure, the survey and surveillance of the pests and disease of both mulberry and silkworm should be continued followed by preparation of prediction models and fore- warning.
- (h) Innovation of cost effective and easy to handle implements or appliances should be the priority. Incubation pot, loose egg box, acid treatment bath etc are some such cheaper innovations.

7.3 POLICY RECOMMENDATION FOR REELING INDUSTRY

7.3.1 Policy Recommendation for the Improvement of Reeling Process and Reeling Machines

- (i) Reeling Industry in Malda district is mainly country charkha based and generally considered as a losing enterprise. Charkha reeling technique is economically suitable for inferior /defective cocoons for producing coarse raw silk. Emphasis should be given to replace country charkha basin with improved charkha basin with smokeless oven for improving working conditions as well as slight improvement in silk industry. Ghosh Basin reeling technique is also an improvement over charkha system can meet all the quality parameters of international grade. So the Reeling techniques in this district within 2010 should be as follows:

Sl. No.	Type of reeling Machine	No of reeling machine in 2001	No of Reeling Machine should be within 2010	Industries under different Agency
1.	Country Charkha	4281	581	under small private sector mostly unorganised.
2.	Improved Charkha	30	1500	under private sector mostly unorganised
3.	Cottage basin with multiend reeling system	1500	2500	Organised under private sector and should be corporate sectors.
4.	Filature basin	100	300	Organised under public undertaking.

More emphasis by Directorate of Sericulture, Govt. of West Bengal should be given to improved charkha and cottage basin associated with multi-end-reeling unit.

(ii) Appropriate reeling technique (sorting, stifling / drying, storage, cocoon cooking, water reeling device etc.) should be adopted depending upon the type of cocoon, and quality of silk to be produced. Appropriate reeling technique would be as follows:

(a) Ordinary multivoltine cocoons like, nichu, pure Mysore, Nistari cocoon should be steam stifled, cooked by open pan system and reeled on charkha and improved charkha within about 10 days.

(b) Improved multivoltine cross- (pure Mysore x NB₄D₂ etc) - cocoons should be steam stifled (chamber type) cooked with open pan\ three pan system and reeled on cottage basin and filature.

(c) Bivoltine Cocoons should be hot air dried, cooked with three pan systems and reeled on cottage basin and filature associated with multi end reeling machine.

(iii) Maintenance of machine is a very important input, often is neglected, even in big silk filatures . Detailed schedule for machinery maintenance

should be worked out, which should include monthly over-hauling, daily cleaning \Oiling etc.

- (iv) Buildings should be shed type with provision to receive light from the north with adequate ventilation.
- (v) Machinery maintenance should be given more emphasis even in small units of reeling sector.

7.3.2. Policy Recommendation for the Availability of Cocoons

- (i) Raw material i.e. cocoon is the major influencing factor in reeling Industry .In silk reeling industry, the cocoon cost is as high as 80%. This is because of the fact that the cocoons purchased contain pupae weighting nearly 80% of the total fresh cocoon weight. Total silk content in fresh cocoon will be in the range of 8-17 in Malda. Waste percentage is also high and obviously more quality of cocoon is required to produce a unit quantity of raw silk .To achieve these levels, six important needs are emerged.
- (ii) To reduce the high cost, careful management in respect of cocoon purchase/selection is important. Cocoon should be purchased from regulated cocoon markets within a radius of about 15 km. through out the year in Malda.
- (iii) Cocoon transaction and price assessment should be based on cocoon quality determined by scientific testing method. Cocoon testing method evolved by CSRTI fairly gives raw silk yield on the basis of silk percentage together with defective cocoon percentage, which should be strictly followed, in cocoon markets.
- (iv) Quality cocoons are a prerequisite for production of quality silk. So bivoltine breeds to be developed in high potential areas for production of graded silk. The overall development of silkworm rearing sector is essential to ensure regular supply of sufficient and better quality of raw cocoon to the reelers.
- (v) Cocoon collective centre should collect all cocoons produce in Maldā on the basis cocoon testing method evolved by CSRTI. So that all the registered reelers could purchase these required cocoons from cocoon collective centre.

(vi) Sufficient quantity of cocoons should be in store to meet a minimum of 10 days requirement in Bhaduri, Baisakhi and Jasthi bund suitable for multivoltine breeds. Aghrani and Chaitra bund suitable for bivoltine hybrids, cocoons are to be stored to meet 2-5 months requirement like Jammu & Kashmir. Three cocoon storage halls should be established in Malda guided by Central Silk Board. Working capital needs for cocoon purchase will be high.

(vii) Silk cocoons, perishable in nature, needs to be marketed immediately after their harvest and the regulated market provide the farmers on opportunity to avail better price for their produce and avoid middlemen. So four cocoon markets should be established in Malda in different sericultural pocket by 2010, which are listed below

Sl. No.	Name of sericultural pocket	No. of cocoon market in 2003	Prospect no of cocoon market in 2010
1.	Kaliachak	1	1
2.	Mothabari	--	1
3.	Sujapur	--	1
4.	Chanchal	--	1

It is observed from the field survey that a negligible amount of cocoon is sold through the cocoon market. So the price of cocoon should be fixed by CCPC under Technical Service Centre in Malda.

7.3.3 Policy Recommendation for Skill Formation & Training

In order to meet the demand for enhanced skill, which will be essential for modernization of production technology, the basic recommendation has been the improvement of Skill through training and education of the reelers in reeling industry.

Higher traditional skill requirement is necessary in small reeling units. But improved reeling machines need skilled labour for better production of raw silk. The following proposed plan may solve the problems related to skilled labour for reeling techniques: 2003-2010.

Sl. No.	Practical Training of reelers on	No of trained reelers according to age limit			No of trainee should be within 2010 Financial out lay Rs. Rs. in Lakh	
		20-30 yrs.	31-40 yrs.	41-50 yrs.		
1.	Country Charkha basin	200 (M)	250 (M)	50 (M)	500 (M)	15.00
2.	Improved charkha basin	500 M F 100 400	400 M F 300 100	--	900 M F 700 200	27.00
3.	Cottage basin with Multi end reeling system	750 M F 500 250	250 M F 200 50	--	1000 M F 700 300	30.00
4.	Filature basin	100 M F 50 50	---	50 (M)	150 M F 50 100	4.50
5.	Total	1550	900	100	2550	76.50

- (i) Training period will continue for three months. All the training centre will be situated at village level. Training centre should be distributed on the basis of cocoon production of an Anchal/Village. These training centres should properly maintain by Directorate of Sericulture and Central Silk Board, with textile technologists.
- (ii) Practical training programme of the owners/managers in silk reeling industry should be more effective to improve the economics of reeling units' workshop for reelers awareness of the different scheme under Central Govt. like NGO/DRDA.
- (iii) Research work should be intensified on improvement of multi-end reeling machine incorporating automatic cocoon feeding device and other testing equipment locally. CSRTI should also bring out manuals in vernacular languages with proper methods of reeling and maintenance of machinery \ including dos" and don'ts".
- (iv) Pre planning \ organization and cost system should be managed systematically. Silk reeling units should function with capacity all through the year.

7.3.4. Policy Recommendation for Finance Mobilization

Silk reeling unit should established by the investment of huge capital (i.e. infrastructures like building, machinery, plant and auxiliary items) The unit should run to full capacity through out the year. Major share of working capital goes towards

purchase of cocoons .So Central Government as well as state government should come forward to finance the reeling units with short, medium and long term loans. The following schemes should be provided by government.

i) Schemes of long term loan to establish improved machines in Malda

Sl. No.	Type of reeling basin	No of units should under this scheme within 2010	Amount of capital investme nt per unit	Amount of working capital per unit	Total cost Rs./000.per unit	Total subsid y per unit per to total cost	Credit per unit on 8% interest	Loan should be paid within 5yrs. quater ly by installment
1.	Country charkha basin (Two basin)	300	20,000	10,000	1,20,000	25%	50,000	2500
2.	Improv d charkha basin (5 basin)	100	50,000	20,000	250,000	25%	150,000	7,500
3.	Cottage basin with multiend reeling units (5 basin)	200	75,000	250,000	3,25,000	20%	200000	10,000
4.	Filature basin (30 basin)	7	1,80,000	5,00000	680000	15%	3,00000	15000

(ii) Short - term loans can be provided from commercial banks to purchase green cocoon through different reeling co-operative societies. The societies will collect raw silk at a market price for the said amount of loan. The amount of loan for a band for different reeling unit should be as follows; Rs.50, 000 For country charkha basin, Rs.1, 00000 for improved charkha basin, Rs.1, 50,000 for cottage basin with multiend reeling machine, and Rs.2, 00000 for filature basin.

7.3.5 Policy Recommendation for Co-operatives

(i) Through cooperative movement reeling industry should be developed in Malda district. The reeling co-operatives society may be the participating body of National Co-operative Development Corporation for receiving

loan from the state government .The reelers co-operative society should have a strong linkage in the marketing system, input supply and services and financing institutions.

(ii) All the reeling units should come under any co-operative society. As in the case of Anand type co-operative a three-tiered structure can be visualised for the Reelers Cooperatives.

(a) The Primary Reelers Co-operatives Society: Primary Reelers Co-operative Society at village \ Block levels consists of members within the Village\Block Jurisdiction. The number of cooperative society should be as follows:

Name of Village	No of proposed co-operatives society	No of Reeling units cover
1. Khaltipur	2	40 (6.15)
2. Mozampur	3	70 (10.77)
3. Alipore-I	3	75 (11.54)
4. Alipore-II	2	40 (6.15)
5. Gayeshbari	5	100 (15.38)
6. Sujapur	5	110 (16.92)
7. Bamangram Mosimpur	4	75 (11.54)
8. Jalalpur	5	80 (12.31)
9. Sripur-I	2	30 (4.62)
10. Alinagar	2	30 (4.62)
Total	33	650 (100)

Figures in parenthesis is percentage of total

(b) The District Reeler's Co-operative Union. The union at district level having a large professional staff will be mainly responsible for procurement and processing of silk cocoon and raw silk. Under each union, there will be a stifling centre directly managed by the union. The stifling centres will have their own staffs, who are technically sound and cater to the needs of the member of co-operative societies in their Jurisdiction. The technical staff will visit these societies regularly say, weekly once and solve the problem of the reeler in the villages. The District Reelers Co-operative Union can take up additional activities in production, processing and marketing of both input and output. Three District Reelers Co-operative Union should establish at Jalalpur, Sujapur and Kaliachack, respectively.

- (c) The state federation will be mainly responsible for centralised marketing of raw silk and cocoons. It can take up interstate, marketing raw silk and cocoons. The federation will also be responsible for controlling the quality of raw silk and take up its exports. It will take the guidance in technical and financial matter from the CSB and its subsidiary institution and help itself to build sound extension system at union level.

7.3.6 Policy Recommendation for Marketing Process of Silk Yarn

The exploitation of the reelers by the Mahajans or merchants is common phenomena in Malda district. Barring a few, most of the reelers are poor and cannot keep the silk yarn for any length of time. They have to sell the reeled yarn immediately to get the working capital to buy cocoons afresh. To control of buying and selling of silk yarn the crux of the amending provision consisted of the following should be introduced by the govt. (Aziz, Abdul and Hanumappa, H.G, 1985).

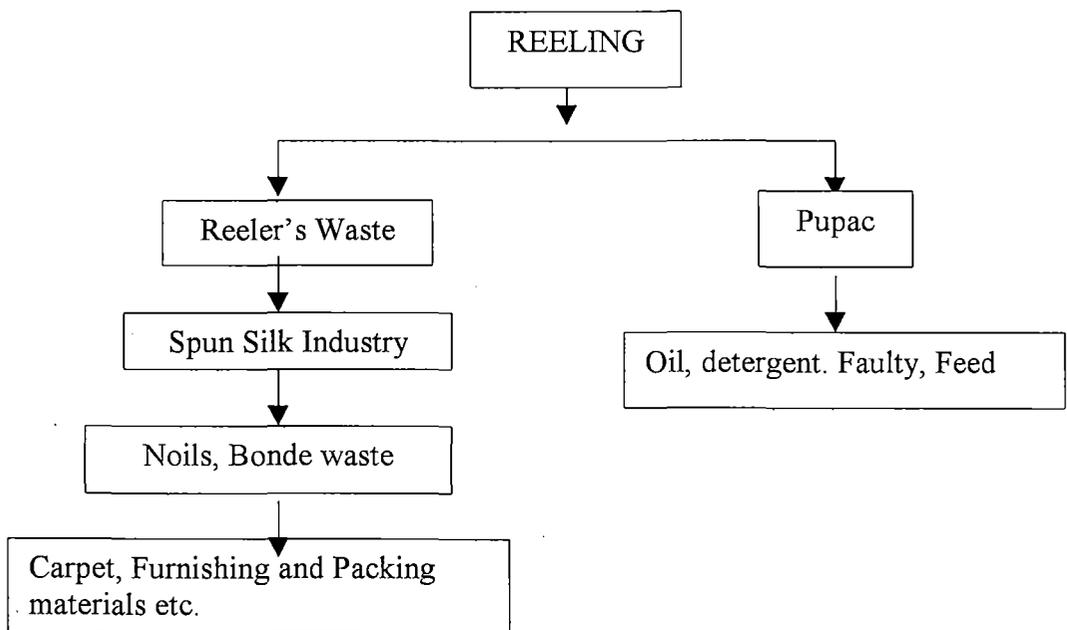
- (a) Every feeler should bring his silk yarn to the silk exchange for sale and trader cannot buy it except in the Silk Exchange.
- (b) The sale will be by open auction conducted by officers of the department of sericulture.
- (c) The weight age of the silk sold will be by accurate weighing machines maintained by the Silk Exchange.
- (d) Payment will be made is full and in cash by the buyer to the seller in the presence of Silk Exchange officers and the buyer cannot more the silk till full payment was made.
- (e) True and correct accounts will be maintained by the reelers and the buyers and the officers of the Silk Exchange can check the correctness of the accounts at any reasonable time.
- (f) A fee of 2% of sale value will be collected as market fee for facilities to be rendered to buyers and sellers.

7.3.7 Other General Recommendation for Development of Reeling Industry

- (i) The quality of water plays an important role in silk reeling. The water quality needs to be corrected to achieve the desired results in silk reeling by an economic treatment technique. Sericulture should organise a mobile

water-testing laboratory to assist the reelers, so that reeling water could be tested at their doorsteps. Water softening chemical should be offered to the reelers through cocoon market and silk exchanges.

- (ii) To make the production system more efficient the infrastructural needs of the reeling industrial units should be fulfilled. Power supply, water supply, transport and communication provisions. The authority should handle government policy financial provision.
- (iii) Silk waste obtained at various stages of sericulture activity can be considered as a blessing in disguise for the reelers and the consumers. It can reduce the net cost of production and enhanced the economic gains to producers. So silk waste obtained in various forms and degrees, can be utilised most effectively as indicated in the flow chart. (Flow chart of recycling of silk-waste):



7.4 Policy Recommendation for the Development of Twisting and Weaving Industry

It has already been pointed out that Malda is the core district in mulberry cultivation, silkworm rearing and silk reeling sector in West Bengal. In the absence of developed weaving sector the silk twisting industry has not well developed in Malda district. Nearly 61% of the total silk of the state is produced in Malda district. But

unlike Murshidabad, Malda is not developed in twisting and weaving sector and that's why most of the raw silk produced in the district is sent outside the district for their ultimate utilisation. So there is need a group of policy for the development of silk twisting and silk weaving industry in Malda. Some of the policy recommendation is directly concluded from the values of the variables for the formulation of most preferred correlation Matrix. Other recommendation has been framed by depending on the author's understating about what could be done for development of silk twisting and weaving industry. The policy recommendations for the development of silk twisting and weaving (power loom) industry may grouped under the following heads.

7.4.1 Size of the Unit

Optimum size of the unit and number of mandays to be employed in a year in silk twisting and weaving industry should be as follow.

Industrial sector	Optimum size of the unit (No.of workers)	Mandays per year per unit	Optimum size of the production in a year
1. Silk Twisting	15	4200	4200 (kg)
2. Silk weaving industry power loom No (06).	8	2240	36960 (mts.)

(i) While setting up new units the concerned government departments and other development agencies should see that twisting and weaving industries are persuaded to accept this optimum size and accordingly fix the inputs and outputs.

7.4.2 Policy Recommendation for Availability of Qualitative Raw Silk

To make the production system more efficient and to increase the productivity and the income qualitative raw silk should be available for both twisting and weaving sector in Malda. To ensure regular supply of sufficient and better quality of raw silk following steps are necessary for twisting and weaving sector.

- (i) To establish quality seed infrastructure with productive silkworm breeds. Overall development of grainage industry is essential that is mentioned earlier.

- (ii) Organized mulberry plantation for production of quality leaves with the involvement of farmers through different project provided by CSRTI and State Government is mentioned earlier.
- (iii) Technology dissemination for capacity building of the rearers so as to improve the productivity. Different policy has been mentioned in previous chapter for the improvement of quality of cocoon and to increase the quantity of cocoon.
- (iv) Improvement in pre cocoon sector is only possible through improvement in the post-cocoon sector, Reeling sector should be development. The policy for the development of reeling units in Malda has been mention in earlier.
- (v) In order to overcome some of these mal-practices and irregularities and to ensure stable prices for raw silk the government of West Bengal established should established silk exchange like Karnataka Government. The silk exchange should be established in Kaliachak in Malda district. The main objectives of the silk Exchange should be:
 - (a) To provide a common market for raw silk and its regulation.
 - (b) To protect the reelers by enforcing them to bring raw silk to the Silk Exchange for the first sale.
 - (c) To fix the price of raw silk in open auction and to maintain the quality of raw silk.
 - (d) To minimize mal practices and irregularities such as underweighting, payment of cash on installments, lack of proper accounting etc.
 - (e) To wean away actual weavers from the clutches of master weavers.
 - (f) To avoid middle men and
 - (g) To have control over silk industry for the promotion of social justice to all concerned.

Three objectives are to be achieved by the following mechanism.

- (a) Bring reelers, twister, and weaver, power loom units together in the Silk Exchange.
- (b) Traders, weavers and twister, are to be given licensees to buy silk yarn in Silk Exchange; and

(c) Market fee collected in the silk Exchange is to be credited to a price stabilization and Development fund and this amount is to be used for providing necessary facilities to the reelers, weavers, traders, twister in silk Exchange.

Along with Silk Exchange a fully owned government company called West Bengal Silk Marketing Board should established with an authorised share capital of Rs. 5 crores and a paid up share capital of Rs 1 crore to purchase a reasonable quantity of raw silk (at least 25% percent of the market arrivals of raw silk) in open auction competing with the other buyers. The main objective of silk Exchange should be social rather than economic or technical.

7.4.3 Policy Recommendation for Finance Mobilization

Silk Twisting and silk weaving industry also is established by investing huge capital. The unit should run to full capacity through out the year. Major share of working capital goes towards purchase of raw silk. It becomes a crucial factor for management to have adequate fund for purchase of raw silk. The following schemes of assistance may be proposed as a guideline for new sets up of twisting and weaving industry.

(i) Assistance of Twisting and Weaving Units

Particulars	No. of units	Cost per unit Credit Rs. '000	Total cost Rs. '000	long term Subsidy Rs. '000
Twisting Units (600 spindle)	10	CI 5,57 WC 489	1064	425
Weaving Units (Loom-6)	15	CI 490 WC 329	819	327
C1- Capital Investment WC- Working Capital				

(ii) For mobilization of Capital investment in the share capital of cooperatives and private enterprises, long term industrial financing is needed to introduce through national and state industrial financial institutions. Government should provide contribution in the share capital of some co-operative societies.

- (iii) Short-term loans can be provided from proposed West Bengal Silk Exchange for purchase of raw silk. West Bengal Silk Exchange can provide also new machines and tools for both industries.
- (iv) With a view to expand the market of the power loom products incentives in the form of subsidy should be given to co-operatives to organise annual exhibitions of different type of silk saree in blocks and towns and to open up few show rooms in different district within and outside the state.
- (v) The government must subsidize the machineries required by twisting and weaving units.
- (vi) State and Central Government should pay more attention in the financing of research development as well as training schemes taken up for improving the post cocoon industrial sector in this district.
- (vii) Modernization of tools and equipment in further year should be taken up as a centrally sponsored scheme on 50:50 bases.

7.4.4 Policy Recommendation for Skill Formation and Training

Sericulture and silk reeling are important production units in Malda district, but this district is not specialised in silk weaving like Murshidabad. The development of silk weaving depends on the improvement of skill through training and education of the labour in related to twisting and weaving industry.

- (i) Higher traditional skill requirement is necessary only in weaving sector. For twisting sectors the requirement of traditional skill is low and development of the respective sector depends more on the adaptation of non-traditional skills. Thus number of training programmes for twisting and weaving sector should be increased. The following schemes may be proposed for the development of skill formation and skilled labour as well as weavers would be available in this Malda district: (Table 7.4).
- (ii) Managerial training should also be introduced for the management of individual units and co-operatives.
- (iii) Entrepreneur guidance cell should be introduced at district level and this will consist of officials of the industries department, bankers and technicians including some successful entrepreneurs.

- (iv) The swifts should be maintained in good condition. The tension weight on the swift should be checked periodically. The drive to the bobbins should be checked periodically to ensure smooth running. Spindle speed at twisting must be checked periodically as also the twist in the yarn. A schedule must be prepared for routine maintenance of spindle, replacement of spindle oil, lightening of the spindle belt drive, checking the flyer etc.
- (v) In warping special attention should be paid to the creel. A wide variety of creels are used in the weaving industry. For high speed warping, highly sophisticated creels with tension, control, stop motions etc are required. For better economics in weaving, longer warp lengths should be practised.
- (vi) Special attention must be given to better house keeping avoiding oil and metal stains and soiling of the fabric. Proper lighting to enable twister and weavers to work with least stain on their eyes must be ensured. Use of humidifiers in dry seasons goes a long way in improving twisting and weaving operations.

7.4.5 Policy Recommendation for Marketing of the Products

Malda is the source of raw silk, i.e. silk yarn; it never developed much in twisting and weaving because it has not local market. The chief marketing centres are Kolkata, Bangalore, Mumbai, Bhagalpur and Tamil Nadu for weaving products and Murshidabad, Bhagalpur, Bangalore is for twisting products. So the development of twisting and weaving units depends on rich marketing system more effective. The following steps are necessary for twisting and weaving sector.

- (i) A regulated market for buying and selling silk twisted yarn and weaving product should be established in Malda district. The regulated market would be (proposed) under West Bengal Silk Marketing board. It should be established with and authorised share capital of Rs. 5-10 crores.
- (ii) Twister weavers, traders are to be given licenses to buy silk yarn, twisted yarn and weaving products in the regulated market.
- (iii) All the twisting and weaving sectors are bound to sell their products in regulated market.

- (iv) The regulated market under silk Exchange/West Bengal Silk Marketing Board will purchase a reasonable quantity of the products (at least 30-40 percent of the market arrivals of products) in open auction competing with the other buyers.
- (v) Governmental staff will fix the prices of raw silk, twisted yarn, and weaving products.
- (vi) The sale will be by open auction conducted by officers of the Department of Sericulture.
- (vii) The buyer should make the payment either in full or in cash to the seller in the presence of Silk Exchange officers.
- (viii) The silk to be sold should be properly weighed by accurate weighing machines maintained by the Silk Exchange.
- (ix) Government should establish a programme for promoting the sale of silk goods within the country for which there is great potential. Malda silk can be promoted within the domestic market of the West Bengal silk industry co-operation chalks out an active sales promotion programme all over the India.

7.4.6 Policy Recommendations for Product Diversification

Apart from traditional products new non-traditional goods should be introduced after examining the consumers' preference, market orientation and type of skill available. In fact weaving industrial units usually produce various traditional utilitarian cloth and they do not commonly produce the objects of artistic value. So the diversification of products is essential for the development of silk industry.

- (i) A variety of artistic object and various none traditional consumer goods requiring slightly upgraded skills should be encouraged for production by the weavers and this short terms training to the weavers is imperative. How ever desired diversification of products should be first worked out keeping in view potential demand and subsequently steps should be taken to products and popularise the new items.

- (ii) Scope of product diversification in weaving industry is high. Non-traditional item e.g. furnishing fabrics, dress materials, silk chaddar, cloth for decoration etc. can be introduced.
- (ii) There is also scope for introduction of weavers design, block printing and in some cases tie and dye prints. There should be a design development centre at Malda which should try to introduce weavers modify thus maintaining distinction and continuity as well as

7.4.7 Policy Recommendation for Cooperatives.

- (i) A scheme of rehabilitation of twisting and weaving industrial units should be taken up by those co-operatives, which can be made viable with supervised credit. The main ingredient in this programme will be the share capital participation of state government. The National Co-operatives Development Corporation may be the participating body for giving loan to the state government for share capital participation. West Bengal Silk Marketing Board should encourage the twisting and weaving industrial unit to come under co-operative society. Two co-operative societies for twisting and weaving industrial unit are essential in this district. Basic function of these co-operative societies is:
 - (i) Market Development Assistance towards rebate on sale of cloth assistance forwards design development show room and transportation costs for participation in fairs. This scheme should be implemented with central assistance.
 - (ii) It should be proposed to provide 3% interest subsidy to the silk twisting and weaving co-operative societies as the working capital loans sanctioned by the District Co-operative Central Banks.
 - (iii) The scheme should be provide comprehensive package of assistance for training, modernisation of loans, margin money, work shed, go down, design development etc.
 - (iv) Training programmes, should also include measures for greater awareness on the various financial schemes, Loan and grant opportunities provided banks, other institutions and government organisation.

7.4.8 Other General Recommendation for Development of Twisting and Weaving Industrial Units

- (i) To make the production system more efficient, the infrastructural needs of the industrial units should be fulfilled. Power supply, water supply transport and communication provisions, financial the right authority should handle provision.
- (ii) There is need to electrify all the twisting and weaving units and electric supply should be regular.
- (iii) Government should take steps such that all the units irrespective of size and capital can be brought under the coverage of insurance policies.
- (iv) A single line of administration can be recommended which assumes the overall responsibilities for the development of twisting and weaving industry and take care of all aspects for reducing the inconvenience faced by them.
- (v) Before implementing any scheme, technical feasibilities and other possible infrastructural facilities should be examined.
- (vi) The entrepreneurship building programmes should also adopt measures so that capability.

The set of policies outlined above is not an exhaustive one. In fact, those policies are subject to change with changing time, environment and activity. Many more policies may be necessary for bringing significant changes in all the sectors under sericulture and silk weaving industry. This however needs examining specific problems of individual units of any particular industry. It goes without saying that implementation of the alternative plans and realisation of the policies will need very efficient and devoted functionaries, since the beneficiaries here as directed by stereotype motivation and inward looking conflicting culture of the sericulturists. It may be necessary that the entire programme of sericulture and silk weaving industrial development may be marshaled through various governmental institutions and selected voluntary organisation.